

## DATA EVALUATION RECORD

### S-METHOPRENE (Z112-011)

**STUDY TYPE: Product Performance (OPPTS 810.3400)**

**MRID 47716009**

Prepared for  
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Office of Pesticide Programs  
U.S. Environmental Protection Agency  
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Task Order No. 09-015

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### Disclaimer

This review may have been altered subsequent to the contractor's signatures above.

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**DATA EVALUATION RECORD**

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**EPA Secondary Reviewer:** Angela L. Gonzales 7/9/09 

**STUDY TYPE:** Product Performance (810.3400)

**MRID NO:** 47716009

**DP BARCODE:** DP363825

**DECISION NO:** 408303

**SUBMISSION NO:** 847452

**TEST MATERIAL:** Z112-011 (a.i., 8.62% w/w S-methoprene)

**STUDY NO:** FR-R0106

**SPONSOR:** Management Contract Services, Inc., Valdosta, GA

**TESTING FACILITY:** Not provided

**TITLE OF REPORT:** Field Efficacy Evaluation of Z112-011 on *Aedes aegypti* Mosquito Larvae

**AUTHORS:** Akstins, E., and B.R. Coon

**STUDY COMPLETED:** December 2, 2008

**CONFIDENTIALITY CLAIMS:** Confidential material is included in a confidential appendix.

**GOOD LABORATORY PRACTICE:** A signed GLP statement was provided. The study was not GLP compliant in at least the following ways: the quality assurance unit did not meet the requirements of 40 CFR Part 160.35; written SOPs were not formally set forth by management; and an approved written protocol including the requirements of 160.21(1) through (15) was not developed prior to the study.

**STUDY SUMMARY:** A field study was conducted in Bronson, Florida to determine the efficacy of a single application of Z112-011 (a.i., 8.62% S-methoprene) against mosquito (*Aedes aegypti*) larvae. The test microcosms were 10 ft x 10 ft constructed pools lined with plastic sheeting and filled to a depth of 12 inches with local pond and well water. Three pools were treated once with one Z112-011 briquet and three were left untreated. A floating cage containing 20 third instar larvae was added to each pool and monitored for mortality and eclosion. At 7, 16, 24, and 37 days after

treatment, the cages were replaced with new cages of larvae. The test was terminated 54 days after treatment. The mean mortality of all five sets of larvae in the treated pools was significantly higher than that of larvae in the control pools. Mean mortality in the treated pools was only 65% and 53% for the first two sets of larvae, respectively, attributed to some fourth instars inadvertently being included. Mean mortality for each of the final three larval sets in the treated pools exceeded 98%. Z112-011 effectively controlled third instar *Ae. aegypti* larvae for up to 54 days in this test.

**CLASSIFICATION:**      **Acceptable**

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### **Test Material**

Z112-011 (a.i., 8.62% w/w S-methoprene), Lot No. NB126-95-13

### **Test Methods**

During October-November, 2008, a 54-day field study was conducted in Bronson, Florida to determine the efficacy of a single application of Z112-011 against *Aedes aegypti* larvae. The larvae were hatched from *Ae. aegypti* eggs obtained from the University of Florida and reared under laboratory conditions (82.4°F, 75% relative humidity, 12 hrs light:12 hrs darkness photoperiod). Neonates were placed in white enamel pans containing deionized water and provided ground Tetramine fish food at a rate of 2 mg on day 1 and 1 mg on day 4. Third instar larvae were used in the test.

The test microcosms were 10 ft x 10 ft x 2 ft deep pools constructed of wood and corrugated metal, and lined with plastic sheeting. The pools were filled to a 12-inch depth with equal amounts of local pond and well water, and were allowed to equilibrate for two days prior to the test. The water was not changed during the study. A weather station was used to monitor ambient temperature, water temperature, relative humidity, and rainfall.

To house the test insects, vertical floating cages were constructed from 4 in x 10 in PVC pipe with a PVC cap on the lower end. The cap and the sides of the pipe contained openings covered with small gage tulle (bridal veil material) to allow water exchange. The top of the pipe was connected to a Bioquip styrene mosquito breeder to allow observation of pupae eclosing to adults. Each completed cage was then inserted through a hole in the middle of a 9 in x 9 in piece of Styrofoam, which allowed it to float freely around the pool.

Twenty-four hours prior to introduction of the larvae, one Z112-011 briquet was added to each of three pools. Three untreated pools served as the control group. At test start, one cage containing 20 third instar *Ae. aegypti* larvae was placed in each pool. At intervals of 7, 16, 24, and 37 days after treatment, the cages were removed and replaced with clean cages of 20 larvae each. The removed cages were monitored for the number of live and dead larvae, live and dead pupae, and incomplete and viable adults.

All data were analyzed for statistical significance using ANOVA.

### Results Summary

During the test, the ambient temperature ranged from 24.6 to 90.3°F, and the water temperature ranged from 36.9 to 103.5°F. Rainfall during the test totaled 2.92 inches.

Results are summarized in Tables 1 through 5. In each of the five sets of larvae tested, mortality was significantly higher in the treated pools than in the control pools. For the first set of larvae (Table 1), mean mortality after seven days in the test material pools was 65%, compared to 5% in the control pools. Although the difference was statistically significant, mortality in the treated pools was low. The study authors attributed this to the fact that some of the larvae were determined to be fourth to late-fourth instars, which were minimally exposed to the test material before pupating.

Table 1. Mortality of <i>Ae. aegypti</i> larvae exposed to Z112-011 from 10/7/08 – 10/12/08 (7 days after treatment)								
Treatment	Rep	Total dead larvae	Total dead pupae	Total incomplete adults	Viable adults	Total number of larvae	Mortality (%)	Mean mortality (%)
Control	1	1	1	0	18	20	10	5
	2	0	0	0	20	20	0	
	3	1	0	0	19	20	5	
Z112-011	1	0	8	4	8	20	60	65
	2	0	10	5	5	20	75	
	3	0	8	4	8	20	60	

Data from pp. 15, 17, MRID 47716009

Mean mortality in the second set of larvae (Table 2) was 8.33% in the controls, compared to 53.33% in the test material group. Although statistically significant, the low test material group mortality was again attributed to the presence of late fourth instars in the test insects.

Table 2. Mortality of <i>Ae. aegypti</i> larvae exposed to Z112-011 from 10/13/08 – 10/21/08 (16 days after treatment)								
Treatment	Rep	Total dead larvae	Total dead pupae	Total incomplete adults	Viable adults	Total number of larvae	Mortality (%)	Mean mortality (%)
Control	1	0	1	1	18	20	10	8.33
	2	0	1	0	19	20	5	
	3	0	2	0	18	20	10	
Z112-011	1	0	14	0	6	20	70	53.33
	2	0	2	7	11	20	45	
	5	0	5	4	11	20	45	

Data from pp. 15, 17, MRID 47716009

Third star larvae were carefully selected for the third set (Table 3). Mean mortality in the third set was 100% in the test material group, compared to 5% in the controls.

Table 3. Mortality of <i>Ae. aegypti</i> larvae exposed to Z112-011 from 10/21/08 – 10/29/08 (24 days after treatment)								
Treatment	Rep	Total dead larvae	Total dead pupae	Total incomplete adults	Viable adults	Total number of larvae	Mortality (%)	Mean mortality (%)
Control	1	0	0	0	20	20	0	5
	2	3	0	0	17	20	15	
	3	0	0	0	20	20	0	
Z112-011	1	0	20	0	0	20	100	100
	2	0	17	3	0	20	100	
	3	0	20	0	0	20	100	

Data from pp. 15, 17, MRID 47716009

Mean mortality in the fourth set of larvae was 98.33% in the treated group, compared to 13.33% in the controls (Table 4). The high control mortality was determined to be due to contamination by a previously-used pipette.

Table 4. Mortality of <i>Ae. aegypti</i> larvae exposed to Z112-011 from 11/2/08 – 11/12/08 (37 days after treatment)								
Treatment	Rep	Total dead larvae	Total dead pupae	Total incomplete adults	Viable adults	Total number of larvae	Mortality (%)	Mean mortality (%)
Control	1	3	2	0	15	20	25	13.33
	2	0	0	0	20	20	0	
	3	0	2	1	17	20	15	
Z112-011	1	0	20	0	0	20	100	98.33
	2	0	14	5	1	20	95	
	3	0	20	0	0	20	100	

Data from pp. 16-17, MRID 47716009

Mean mortality in the fifth set of larvae was 6.67% in the control, compared to 98.33% in the treated group (Table 5).

Table 5. Mortality of <i>Ae. aegypti</i> larvae exposed to Z112-011 from 11/11/08 – 11/29/08 (54 days after treatment)								
Treatment	Rep	Total dead larvae	Total dead pupae	Total incomplete adults	Viable adults	Total number of larvae	Mortality (%)	Mean mortality (%)
Control	1	0	0	0	20	20	0	6.67
	2	0	2	0	18	20	10	
	3	0	2	0	18	20	10	
Z112-011	1	1	19	0	0	20	100	98.33
	2	2	13	4	1	20	95	
	3	0	20	0	0	20	100	

Data from pp. 16-17, MRID 47716009

### **Study Authors' Conclusions**

The study authors concluded that Z112-011 effectively controls *Ae. aegypti* third instar larvae for approximately 37 days after treatment.

### **Reviewer's Conclusion**

The reviewer agrees with the study authors' conclusion. The low mortality in the first two larval sets in the treated pools was attributed to the inadvertent presence of some fourth instar larvae.

Mean mortality in the succeeding three sets (up to 54 days after treatment) was  $\geq 98\%$ , exceeding the OPPTS 810.3400-recommended rate of 95%. The product label claims up to 30 days of control. The product label recommends an application rate of one briquet per 100 ft<sup>2</sup> of surface area for low-flow waters up to 2 ft deep which is what was used in the test with the exception that the water depth was 1 ft in the study.

#### **BPPD Reviewer's Conclusion**

It is noted that the studies were conducted in water depths of only one foot and label claims indicate control in water depths of up to 2 feet. However, there are adequate studies available that indicate that the product is effective in water depths of up to two feet as well. For information on these studies, refer to the memoranda from A. L. Gonzales to G. Tomimatsu dated 11/01/06, 3/15/07 and 08/20/07 and the jacket for this product.